AUDIO DESIGN

F600

BROADCAST LIMITER

GAIN dBs REDUCTION
F600 LIMITER/COMPRESSOR

audio & design group
MAIDENHEAD ENGLAND

OPERATION

The F 600 is designed to operate at normal line levels and have a maximum output of +15dB. The maximum input sensitivity for limit threshold is -25dB; thus for an input signal of -10dB and with the input attenuator fully open, 15dB gain is possible.

Unit controls include an input and output attenuator, attack and release controls. A system by-pass switch enables the unit to be completely by-passed (with exception of the line amplifier), the input being connected directly to the line output amplifier. Under these conditions there is unity gain.

Stereo units consist of two independent limiters with a 'stereo' switch which links the DC control circuits. In addition to the standard mono controls, ganged input and output attenuators are also provided for convenience. When used for stereo operation the independent controls can act as pre-sets to compensate for any imbalance on the input signal. For independent mono operation the ganged pots are open and control effected on independent faders.

Operation is simple:
The unit is inserted in the channel with the system by-pass switching the'out' mode. The level is established in the channel in the normal way, such that it is peaking to the normal required level. The 'in' position is selected on the system by-pass switch; the input pot. is advanced to give the required gain reduction, as indicated on the gain reduction meter. The output level limit threshold is established by adjusting the output attenuator to provide the programme and the effect required along with the amount of gain reduction etc. A direct comparison is now available on the system by-pass switch, between compressed and limited signal and the direct unprocessed signal.

If the VU's are used to monitor programme level from the limiter it will be noticed that the meter normally under-reads compared with a steady state tone. This is of course due to the measuring characteristics of the VU device, and observation of the peak-to-peak signal Will verify that the peak output under dynamic conditions is the same as for tone. (See 'Limiting and Compression Considerations' on VU meters).

The release control will be adjusted to suit programme content. The automatic position provides a multiple release time such that fast gain change occurs on top of a long release platform. Such control reduces breathing effects yet enables considerable gain reduction to be effected over long term programme content whilst limiting the fast moment-to-moment gain change to about 6dB. It is thus a mean level programme control. When very high mean levels are required with dynamics compressed within a few dB; fast release time limiting will be necessary. In using the fastest release positions care should be taken to ensure that any distortion introduced at low frequencies (due to chopping of low frequency wave-form by the release action) does not become audible . Any tendency for transient distortion to occur under such conditions can be effectively eliminated by slowing the attack time down. It is in the positions of fastest release that the effect of the attack control is most noticeable; as the attack time is lengthened so overshoot will become increasingly apparent, at the output; thus the slope is dynamically reduced.

Stereo operation is effected by switching the stereo switch to the 'in' position which links the control of both units.

UNIT CONNECTIONS

Rack-mounting units

All F 600-R units are mains powered; the chassis of the units is connected to 0v at the input XLR connector. When using *unbalanced* care should be taken to ensure no hum loops are created when the unit is wired up and earthed via the mains. If desired or necessary the internal 0v connection to chassis may be disconnected and the chassis connection made through the mains only.

Audio connections are via XLR plus/ socket wired:

Pin 1	Chassis/ 0v
Pin 2	Audio return*/ 0v
Pin 3	Audio hot

*When units are supplied with transformers Pin 2 is the audio return. In the case of the E 500 and E 560, tranformers can only be fitted to the main input/ output path; the auxiliary send and return is unbalanced.

Where two F 600-R units are stereo matched or two F 600-RS units quad matched a jack/ jack link is provided.

MODULAR UNITS TYPE 'N'

These use a 16 way Red Range Connector with dowel pins and are wired as follows:

Pin 1	Audio input
Pin 3	Compressor stereo link
Pin 4	+ 24v stabilised supply
Pin 6	Audio output
Pin 7	Chassis
Pin 11	Expander stereo link
Pin 9	Connect to 0v rail
Pin 14	Connect to 0v rail
Pin 16	Connect to 0v rail

F 600 SERIES LIMITER - set up procedure

1 Switch on — adjust meter zero (earlier units have no meter zero pre-set and are set by using the meter mechanical zero).

2 Fully open output attenuator

3 Turn down the internal threshold pre-set (anti-clockwise).

4 Turn FET Bias full up (clockwise).

5 Feed input with 1kHz signal at about 0dBm; adjust the input attenuator so as to give + 12dBm at the output.

6 Turn down fully FET Bias pre-set.

7 Set FET Law pre-set for 38dB attenuation (i.e. -26dBm at the output).

8 Open FET Bias — re-adjust for 1dB attenuation.

9 Increase input level if necessary to give + 16dBm at the output.

10 Adjust Internal Threshold pre-set for + 15dBm output (1dB of Limiting).

11 Adjust Distortion Null pre-set for minimum distortion (typically 0.1 %) with slowest release time.

11a Re-adjust release to fastest time.

12 Increase input by 9dB (10dB of Limiting) and set Meter Range pre-set for 10 dB gain reduction.

13 Rectifier Balance can be checked by monitoring point 'A' with oscilloscope — adjust saw-tooth wave-form for symetrical peaks occuring on each half-cycle of the sine-wave input.

14 Increase input by 10dB (i.e.20dB of limiting) and check meter reads 20dB gain reduction.

If the FET is changed the meter may not be accurate on step 14 and it will be necessary to adjust the FET Law so that it reads 20dB. In doing this the earlier set-up procedures will be disturbed and it will be necessary to:

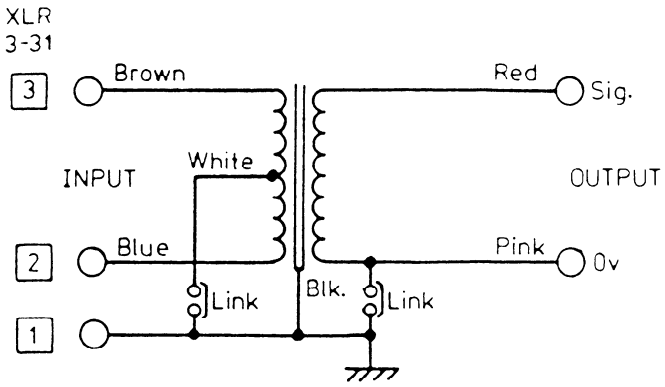
a) Reduce input by at least 25dB (i.e. below Limit Threshold).
b) Adjust FET Bias for 1dB of limiting.
c) Continue with steps 9 through 14 (omitting 11 & 13).
d) If still incorrect repeat cycle until satisfactory.

The unit is now correctly adjusted and check-out complete.

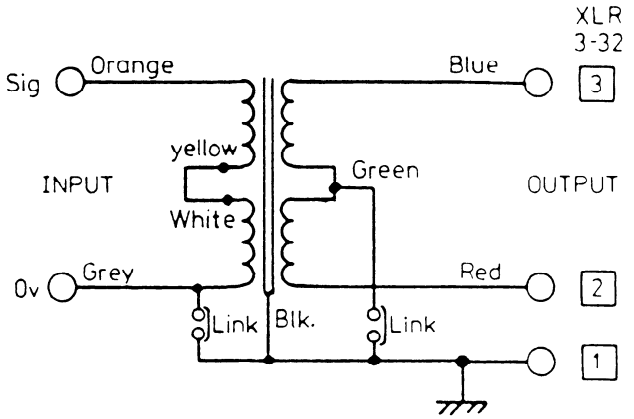
AUDIO LINE TRANSFORMER DATA

Units are normally supplied unbalanced but provision is made for simply adding transformers at a later date, or they can be ordered already fitted by quoting unit series number followed by the suffix -R/T or -RS/T

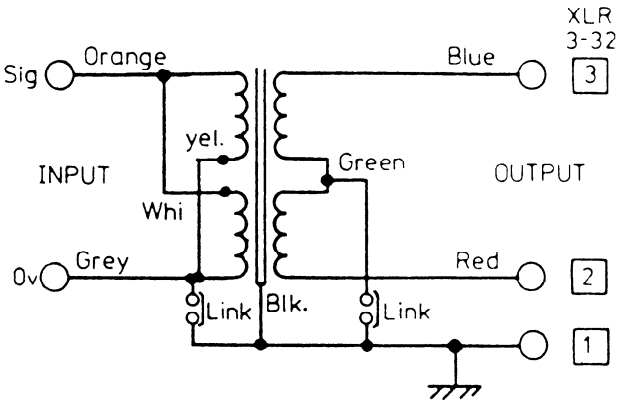
INPUT — 10KΩ
Unity Gain



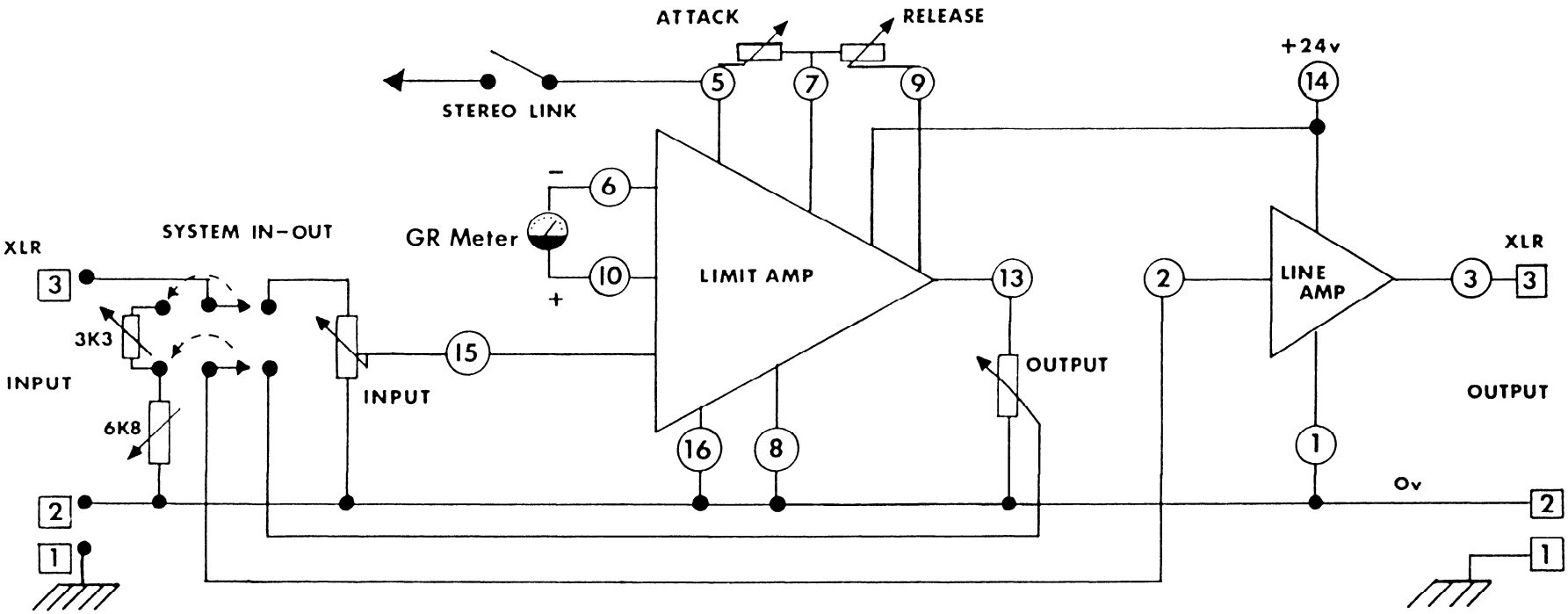
OUTPUT — 600Ω
Unity Gain, terminate with 600Ω for optimum performance.
This configuration is used for unity Equalisers E 900/500 series to maintain optimum noise performance.



OUTPUT — 600Ω
Set-up arrangement providing higher effective clip level of + 22dBm.
F 700/760 series are supplied with this arrangement. The 3K3 resistor that sets gain in the Line amp on the B boards is removed (junction of 15mfd and 4K7 feedback R). There is no degredation of sig-noise.

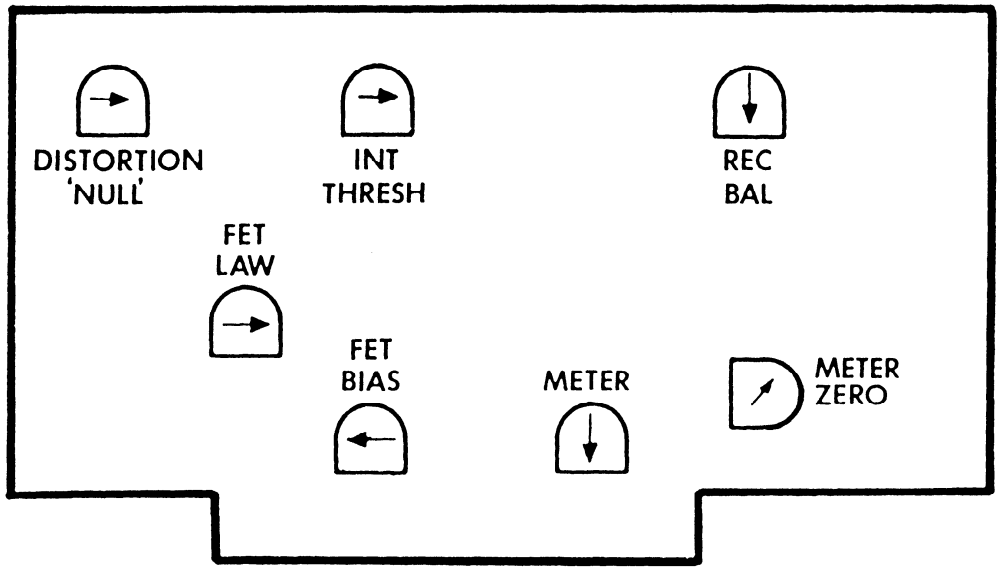


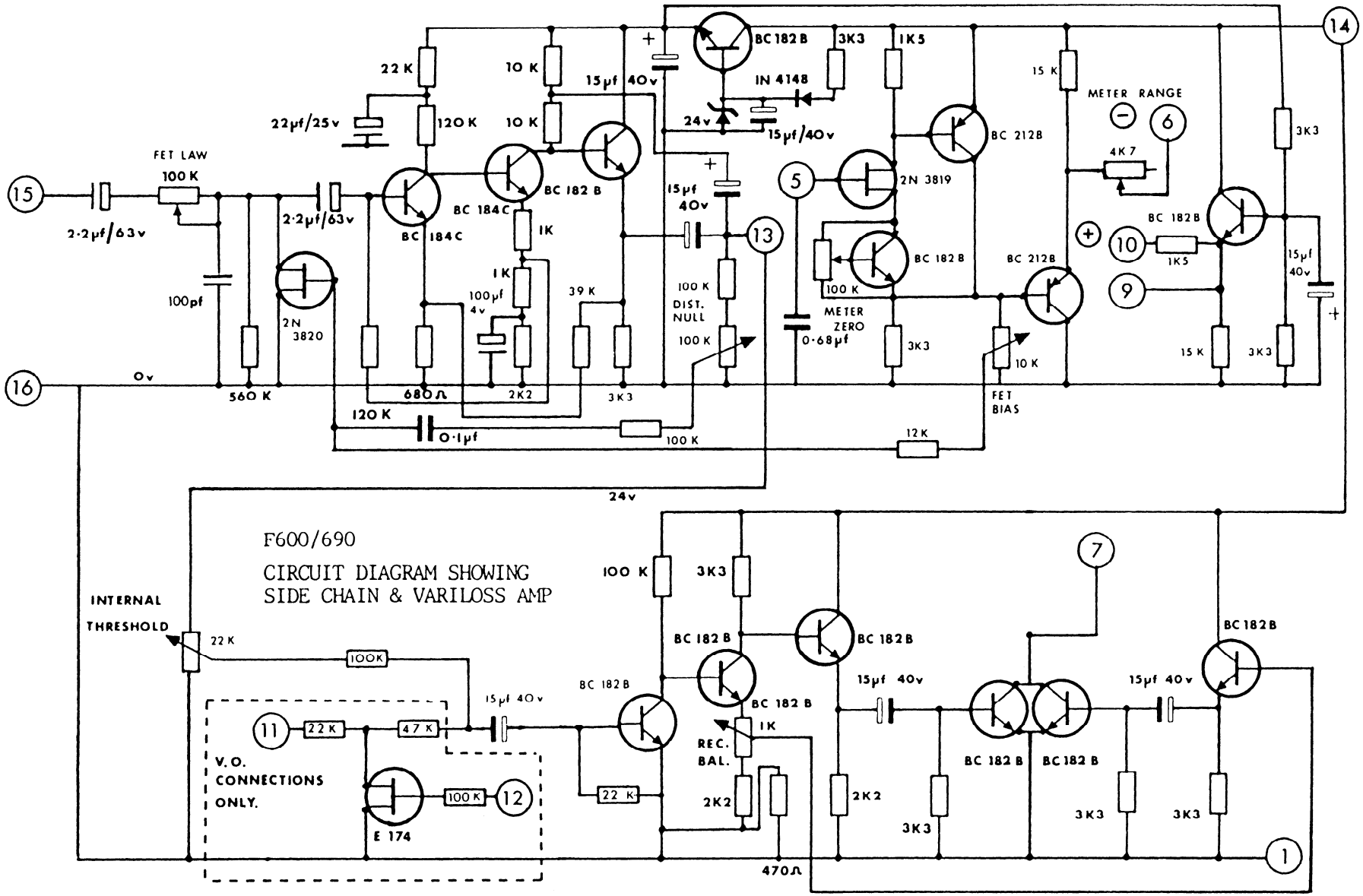
F600 Schematic

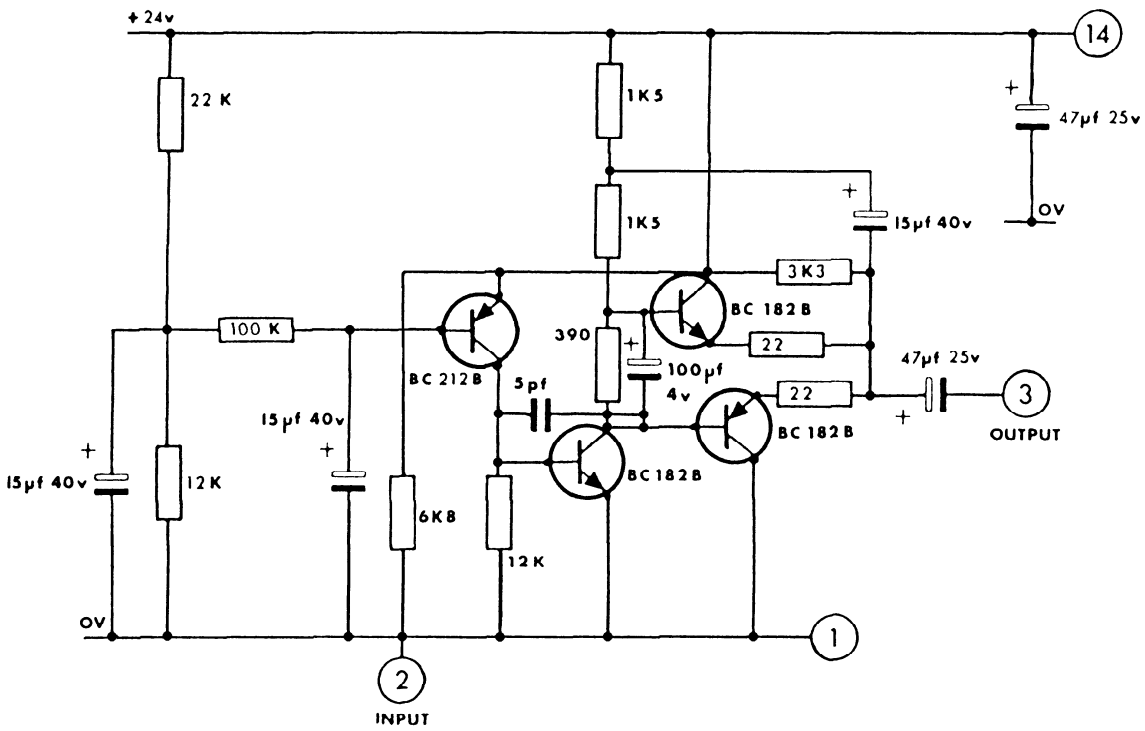


F600 Mk 3

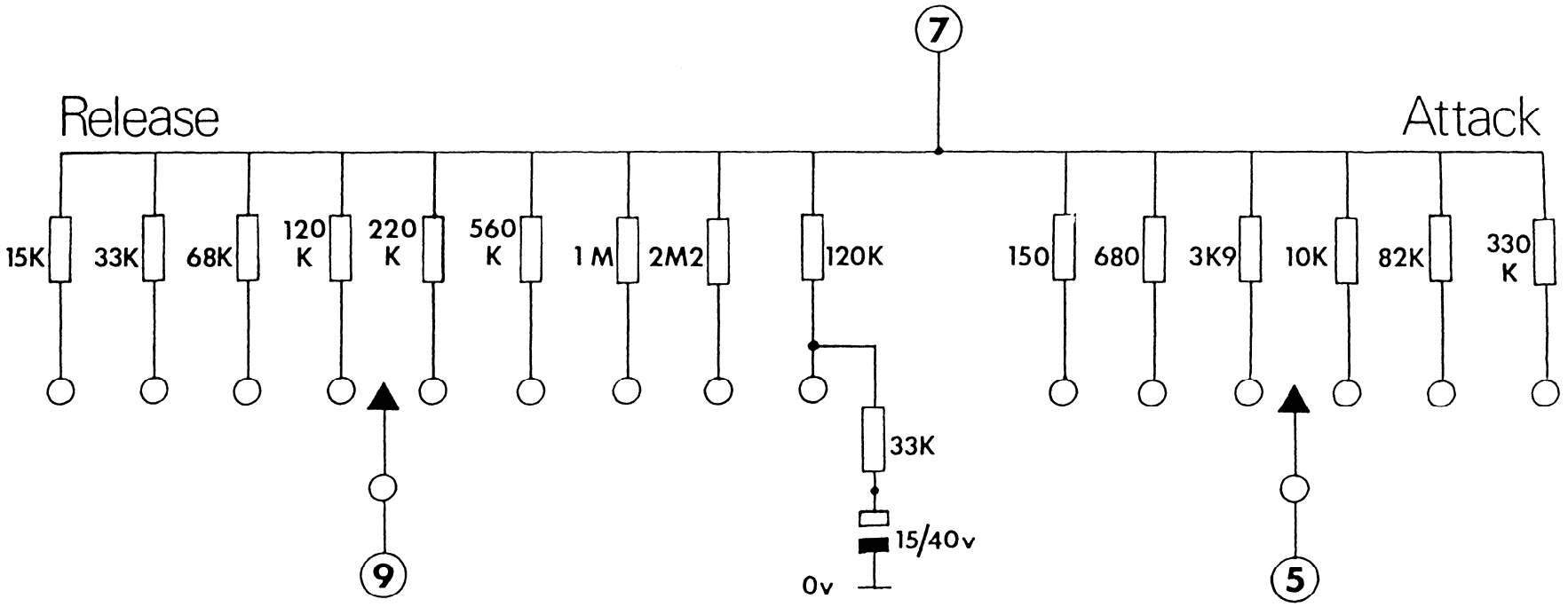
P C BOARD

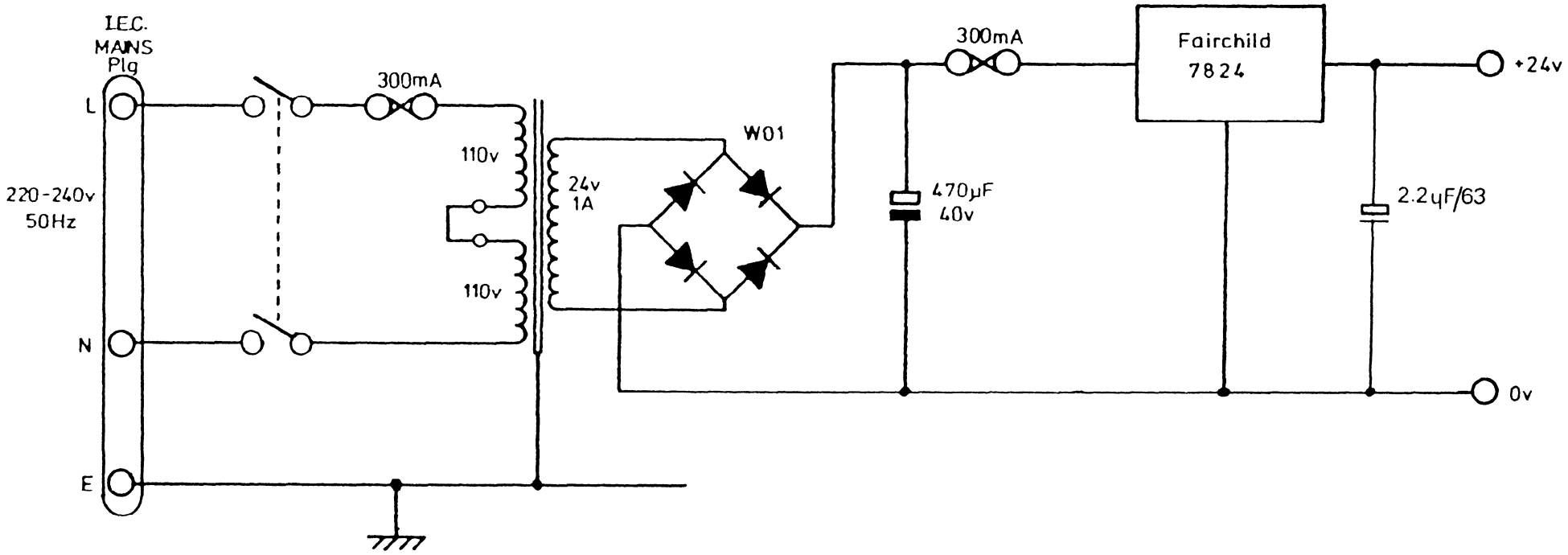



F600/690
CIRCUIT DIAGRAM SHOWING
SIDE CHAIN & VARILOSS AMP
FET LAW
100 K
2·2µf/63v
100pf
2N 3820
560 K
0v
16
15
22 K
22µf/25v
120 K
10 K
10 K
BC 184C
BC 182 B
BC 184C
1K
1K
100µf 4v
39 K
2K2
3K3
680Ω
120 K
0·1µf
100 K
15µf 40v
BC 182B
IN 4148
24v
15µf/40v
3K3
1K5
BC 212B
2N 3819
BC 182 B
100 K
DIST. NULL
100 K
METER ZERO
0·68µf
3K3
15 K
METER RANGE
4K7
6
BC 182B
10
1K5
9
BC 212B
10 K
FET BIAS
12K
15 K
3K3
15µf 40v
14
13
5
24v
INTERNAL THRESHOLD
22 K
100K
15µf 40v
11
22 K
47 K
V.O. CONNECTIONS ONLY.
100 K
12
E 174
22 K
100 K
3K3
BC 182 B
BC 182 B
BC 182 B
BC 182B
1K
REC. BAL.
2K2
2K2
3K3
15µf 40v
15µf 40v
BC 182 B
BC 182 B
3K3
3K3
BC 182B
7
1
470Ω



LINE AMPLIFIER (F600 p c Board)



RELEASE & ATTACK COMPONENTS F600/690

AUDIO & DESIGN (RECORDING) Ltd - Rack Units: Basic Power Supply